

Claims

1. A method of representing a data distribution derived from an object or image by processing signals corresponding to the object or image, the method comprising recursively deriving an approximate representation of a first data distribution derived from said data distribution and analysing the errors of the data elements as a second data distribution when expressed in terms of the approximate representation.
2. A method as claimed in claim 1 wherein the data elements are multi-dimensional and the approximate representation is a subspace of the data space.
3. A method as claimed in claim 2 wherein the subspace is derived using principal component analysis.
4. A method as claimed in any preceding claim wherein the analysis of the errors involves clustering.
5. A method as claimed in claim 4 involving fuzzy clustering using a membership function representing the degree of membership to a cluster.
6. A method as claimed in claim 4 or claim 5 wherein the analysis of the errors involves principal component analysis for each cluster (local or fuzzy local principal component analysis) to produce a subspace representative of each cluster.
7. A method as claimed in 6 comprising, for data elements in a given cluster, analysing the errors of the elements when expressed in terms of the cluster subspace.

8. A method as claimed in claim 7 comprising repeating the steps of deriving a subspace representing an error cluster and analysing the resulting errors to produce a tree structure with a top node and nodes corresponding to the error clusters.

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9. A method as claimed in claim 8 comprising deciding to stop the repeating step for a given cluster depending on the error values.

10. A method as claimed in claim 8 or claim 9 comprising extending the model using new data to add new nodes to the tree.

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11. A method of representing a data element derived from an object or image by processing signals corresponding to the object or image, the method comprising expressing the data element in terms of a representation derived according to any preceding claim.

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12. A method as claimed in claim 11 comprising expressing the element in terms of a tree structure having nodes and determining coefficients of the element for nodes of the tree structure.

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13. A method as claimed in claim 12 comprising using a membership value representing the degree to which the data element corresponds to a node.

14. A method as claimed in claim 12 or claim 13 comprising quantising the coefficients and/or the membership values.

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15. A method as claimed in any preceding claim involving data derived from an image or images in a sequence of images.

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16. A method as claimed in any preceding claim wherein the object or image corresponds to a person or a face.

17. A descriptor of a data element derived in accordance with a method according to any one of claims 11 to 14, or claim 15 or claim 16 dependent on claims 11 to 14.

18. A descriptor as claimed in claim 17 comprising partial descriptors corresponding to nodes in a tree structure, each partial descriptor comprising a node identifier, coefficients for a node and optionally a membership value.

19. A method of matching or classifying a query data element derived from an object or image by processing signals corresponding to the object or image, the method comprising comparing a descriptor of the query data element according to claim 17 or claim 18 with database descriptor elements according to claim 17 or claim 18 using a matching function.

20. Apparatus set up to execute a method according to any preceding claim.

21. Apparatus as claimed in claim 20 comprising a processor, memory and image or object input means.

22. Computer program for executing a method according to any one of claims 1 to 16 or 19.

23. Computer readable storage medium comprising a computer program as claimed in claim 21.